

# CNZ1002 (ON1002)

## Photo Interrupter

For contactless SW, object detection

### ■ Overview

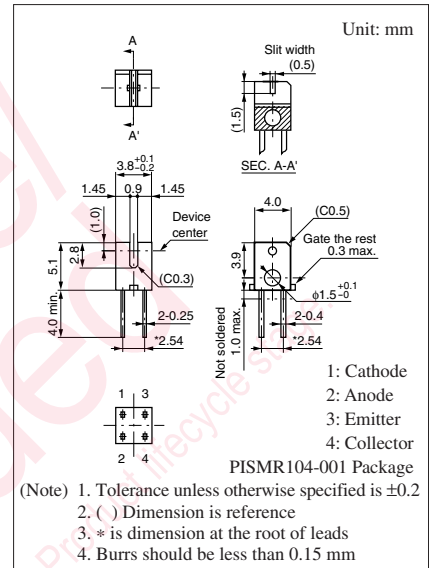
CNZ1002 is an ultraminiature, highly reliable transmissive photosensor in which a high efficiency GaAs infrared light emitting diode chip and a high sensitivity Si phototransistor chip are integrated in a double molded resin package.

### ■ Features

- Ultraminiature: 4.0 mm × 3.8 mm (height: 5.1 mm)
- Fast response:  $t_r, t_f = 35 \mu s$  (typ.)
- Highly precise position detection: 0.25 mm
- Gap width: 0.9 mm

### ■ Absolute Maximum Ratings $T_a = 25^\circ C$

Parameter	Symbol	Rating	Unit
Input (Light emitting diode)	Reverse voltage	$V_R$	6 V
	Forward current	$I_F$	50 mA
	Power dissipation *1	$P_D$	75 mW
Output (Photo transistor)	Collector-emitter voltage (Base open)	$V_{CEO}$	35 V
	Emitter-collector voltage (Base open)	$V_{ECO}$	6 V
	Collector current	$I_C$	20 mA
	Collector power dissipation *2	$P_C$	75 mW
	Temperature	Operating ambient temperature	$T_{opr}$
Storage temperature		$T_{stg}$	-40 to +100 °C



Note) \*1: Input power derating ratio is 1.0 mW/°C at  $T_a \geq 25^\circ C$ .

\*2: Output power derating ratio is 1.0 mW/°C at  $T_a \geq 25^\circ C$ .

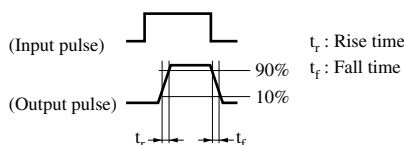
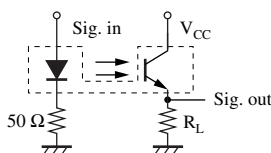
### ■ Electrical-Optical Characteristics $T_a = 25^\circ C \pm 3^\circ C$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input characteristics	Forward voltage	$V_F$ $I_F = 20 \text{ mA}$		1.2	1.4	V
	Reverse current	$I_R$ $V_R = 3 \text{ V}$			10	$\mu A$
Output characteristics	Collector-emitter cutoff current (Base open)	$I_{CEO}$ $V_{CE} = 20 \text{ V}$			100	nA
Transfer characteristics	Collector current	$I_C$ $V_{CE} = 5 \text{ V}, I_F = 1.5 \text{ mA}$	65		480	$\mu A$
	Collector-emitter saturation voltage	$V_{CE(sat)}$ $I_F = 3 \text{ mA}, I_C = 30 \mu A$			0.4	V
	Rise time *	$t_r$ $V_{CC} = 5 \text{ V}, I_C = 0.1 \text{ mA}$		35		$\mu s$
	Fall time *	$t_f$ $R_L = 1000 \Omega$		35		$\mu s$

Note) 1. Input and output are practiced by electricity.

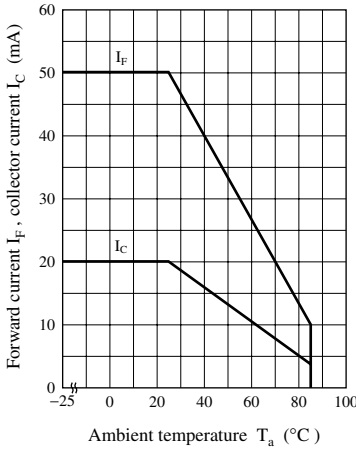
2. This device is designed by disregarding radiation.

3. \*: Switching time measurement circuit

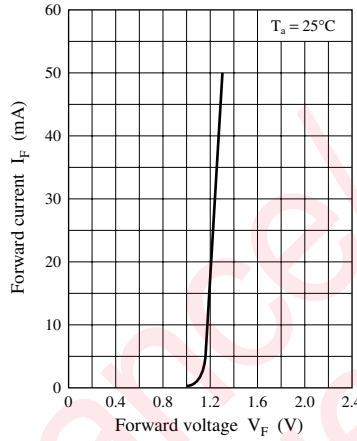


Note) The part number in the parenthesis shows conventional part number.

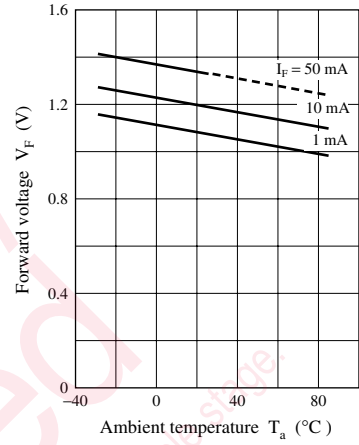
$I_F, I_C - T_a$



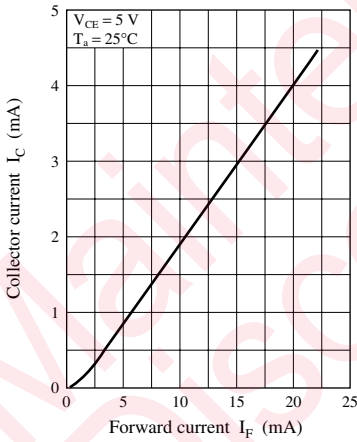
$I_F - V_F$



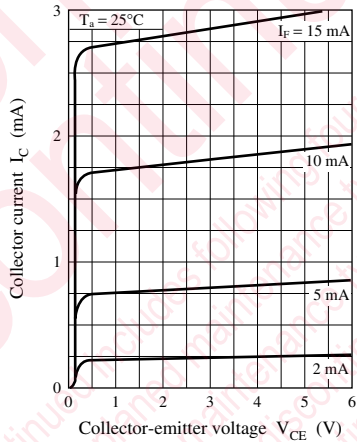
$V_F - T_a$



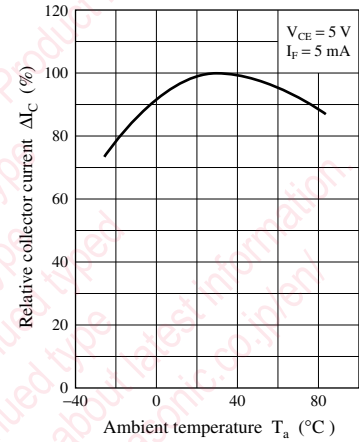
$I_C - I_F$



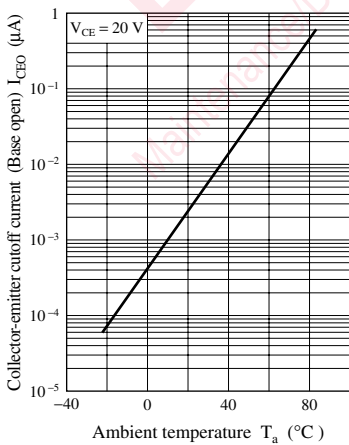
$I_C - V_{CE}$



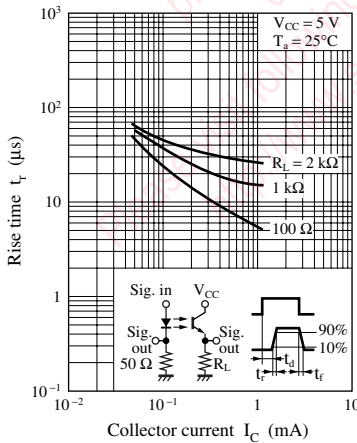
$\Delta I_C - T_a$



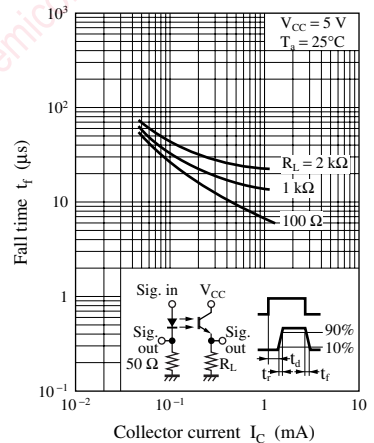
$I_{CEO} - T_a$



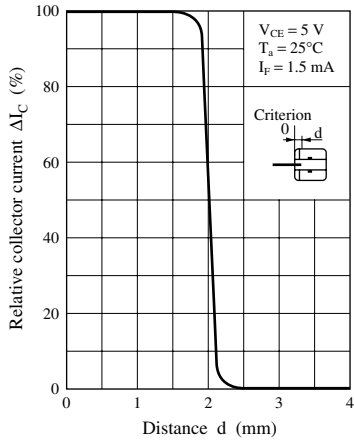
$t_r - I_C$



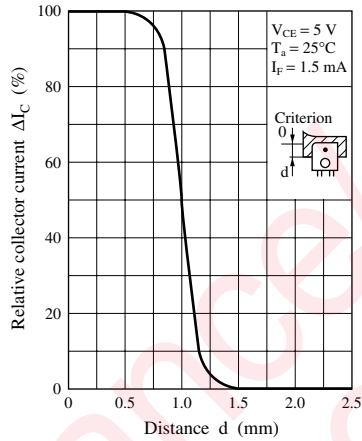
$t_f - I_C$



$\Delta I_C$  — d (1)



$\Delta I_C$  — d (2)



Maintenance/Discontinued includes following four Product lifecycle stage.  
 planned maintenance type  
 maintenance type  
 planned discontinued type  
 discontinued type  
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# Caution for Safety

 **DANGER**

## ■ This product contains Gallium Arsenide (GaAs).

GaAs powder and vapor are hazardous to human health if inhaled or ingested. Do not burn, destroy, cut, cleave off, or chemically dissolve the product. Follow related laws and ordinances for disposal. The product should be excluded from general industrial waste or household garbage.

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